

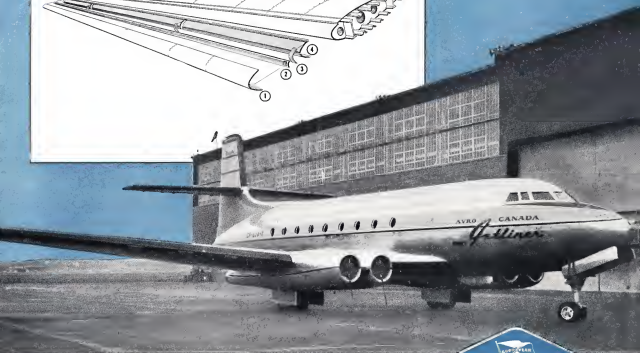
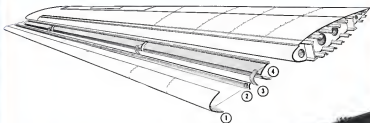
# AVIATION WEEK

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AUG. 20, 1951

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Number 8

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### AVIATION WEEK

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## NEWS DIGEST

### DOMESTIC

**Kaiser Metal Products, Inc.** (located in Keeler Flushing during World War II), has contracted with Glass L. Mabe Co. to build C-47 wings. Aircraft work will require 7,000 more employees at the company's Bristol, Pa., plant. The \$20,000 sq. ft. structure there is being expanded by 300,000 sq. ft. at a cost of \$1 million.

**Boeing B-29** crashed into an apartment building in Seattle's industrial South End shortly after takeoff from Boeing Field. Crash and resulting fire took the lives of the plane's crew and several humans.

**Miss Conrad** arrived at Washington National Airport Aug. 17 completing a non-stop flight from Mexico City in a 115 hp. Super Puma, a 2,075 mi. flight in 19 hr. 5 min. It was the same light plane in which she flew both ways across the Atlantic and coast-to-coast two days.

**CAL** unanimously denied Southwest Airways and West Coast Airlines' merger application which would have given SWA coverage from Seattle to Southern California. The Board said that the Pacific Northwest is a different trade area from the Los Angeles-San Francisco region and wants the local service airlines to continue to serve their own areas.

**Western Air Lines** resumed flights after a 11-day strike of 300 mechanics, ground crew and flight attendants. American Airlines agreed to call the men back and accept conditions. Company spokesmen said that they agreed to discuss an escalation pay clause, frequency of pay days, vacation time and working conditions, and that the strikers had dropped their demands for a union shop with checkoff and collection of dues, as well as a prohibition on hiring out of maintenance work over 1,000 W.A.L. employees were asked by the railroad.

**Kansas Aircraft Corp.**, Wichita, Kan., will operate a 52-million- to 55 million- lb. Navy helicopter plant to be built in Hordelville, Okla. The plant will have a floor area of 104,000 sq. ft. Land, buildings and plant equipment will be mostly Navy-owned.

**CALL** has given Compañia Colombiana a three-year permit to fly between Manaus, Colombia and New York City. Similar applications by Aerovias "Q" and Exapora Aero Inter-América were denied.

**Boeing Motor Co.**, Comstock, N. Y., to make, assemble and test Kollsman's new jet engine and propellers have been made for installation of several millions of dollars worth of new plant and equipment.

**The Board** and that its "secret" ruling, approved by President Truman, will set a precedent. Columbia must not capitulate in any way on its connection with its parent corporation, Pan American World Airways.

### FINANCIAL

**Eastern Air Lines** reported net earnings of \$3,735,135 after depreciation and normal federal taxes for the first six months of this year, putting the carrier well into its 17th year of profitable operation. Gross revenues for the six-month period were \$51,574,000, a 1% gain over the same period last year.

**Kellett Aircraft Corp.**, Canandaigua, N. Y., has been damaged from bankruptcy proceedings under which it operated since October, 1946, when it filed a petition in voluntary bankruptcy. The firm was made available by the court's payment of 100% of its creditors' claims. It is continuing its reorganization work.

**Sperry Corp.** has posted a consolidated net income of \$5,235,574 for the first six months of 1951 after providing for federal income and excess profits taxes. Shipments during the period came to \$107,631,213, a 41% increase over the same period last year. Earnings at end of June were approximately \$500 million.

**Bell Aircraft Corp.** and its subsidiaries have paid a profit of \$1,079,242 after taxes for the six months ending June 30, with undistributed income at that time being \$170 million.

**Seaboard & Western Airlines'** bond has noted a cash dividend of 38 cents per share of common stock payable Sept. 25 to stockholders of record as of Sept. 14.

### INTERNATIONAL

**KLM Royal Dutch Airlines** will overhaul all 1-15 jet engines used on Republic Thunderjets being operated by Atlantic Pacific airlines. The carrier is getting up special workshops at St. Paul Airport, Australia to handle the overhaul work.

**Boeing Motor Co.**, Comstock, N. Y., to make, assemble and test Kollsman's new jet engine and propellers have been made for installation of several millions of dollars worth of new plant and equipment.

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## WHO'S WHERE

### In the Front Office

**Col. E. L. Anderson** has been named new president of *Philpott Inc.* Lines, named by **E. T. Bolton**, who will continue as vice president-director and advise on matters with headquarters in San Francisco. Anderson, who joined PHL in 1918, has been very popular public and sales since 1949. In other PHL news, **Walter E. Hord, Jr.**, has been designated general operations manager and **C. N. Beach** has been made general traffic and sales manager.

**Dr. Ross A. Gitting**, director professor of electrical engineering at MIT, has been named vice president-engineering and in search of *Raytheon Mfg. Co.*, **William M. De Gering**, a noted radio authority during World War II headed a laboratory that developed the SCR-594 radio control for aircraft guns.

### What They're Doing

**T. L. (Tommy) Turkin**, formerly customer relations manager for *Glen L. Martin Co.*, has opened his own business as aviation consultant in Washington, D. C., and Baltimore. His office are at 705 Ring St., Washington and 11 E. 21st St., Baltimore.

**Vernon S. Glaser** has joined the *Glenn Engineering Co.* at 4746 W. Washington Blvd., Los Angeles, to handle development and design work for motor control systems and the aircraft.

**Capt. J. Sorenson** has retired after 22 years as chief test pilot of *Vickers Armstrong Ltd.*, though he will continue with the company as chief liaison officer. His former post has been filled by **G. B. Byrne** at the *Wright Works Ltd.* **Chas. M. Lefkowitz** at the *Lockheed Corp.*

### Changes

**George S. Fantasia** has been designated general factory manager of the *Boeing Radio Division* of *Boeing Aircraft Corp.* In other Boeing Aviation Corp. appointments, **George E. Steiner** has been made general manager of the *Monitors Division* at St. Maurice, Pa., and **Donald M. McGee** become general manager of the *U.S. Navy* division. **Rever** will also continue in general manager of the *Boeing Marine Division* at Dallas, N. Y., while **Edwin J. Kahan** at the *Boeing Corp.* as general manager of the *Boeing Corp.* in *San Francisco*. New plant manager of the *Monitors Division* at *St. Maurice, Pa.*

**Virgil F. Bagnasco** has been made plant superintendent of *Vic Patches Industries, Inc.*, Los Angeles.

### Honors and Elections

**Ben Ross** recently has been awarded the *Daniel Guggenheim Medal* and certificate for 1951 "for a lifetime of outstanding contributions to aviation, including pioneering work in long-range airplane flying boats, amphibians and helicopters."

## INDUSTRY OBSERVER

► *Stinson* division of *Boeing Aircraft Corp.* has signed a licensing agreement with *Turbomec*, jet engine manufacturer at Pau, France, to build and sell the 140 hp. *Gustav* gas turbine engine in the U. S. The French gas-turbine has an elongated compressor chamber, single-type rotary fuel injector, weighs 135 lb. Diameter is 20.5 in. and length 12 in. Current critical speed is reported at 580 h.p. with 3,000 h.p. overhead a definite future possibility.

► A complete engineering analysis on a *Boeing MIG 15* fighter is to be made by *Aer Materiel Command* at *Wright Patterson AFB*, using a virtually intact MIG which was shot down off the west coast and salvaged by the Navy. A British carrier was in on the bill. Official announcement of the engine modification of the release between U. S. and British. Feasibility that the plane may be released to flight condition and flight tested against U. S. fighters is being considered. Otherwise an American copy of the plane may be produced for this purpose.

► Recent flight test reports on U. S. turboprop planes indicate considerable improvement in reliability and increasing rate of turbine engine failures. *CAF-1* having been severely damaged in the 38 hour flight in which all four of its *Albion T-40* double-shaft turboprop engines performed smoothly from liftoff to touchdown in a performance highly satisfactory to *General* engineers.

► *Air Force* is planning a cycle modification program on four-engine *Douglas C-54* cargo planes. It will involve more 3,000 engines per *Thyssen Aircraft Corp.* modification order which is operating at *Boeing* base. Prior to the C-54 program *Boeing* will start a modification program on *North American B-25* World War II bomber taken out of "military storage" at *Pyote, Tex.* to be used for two-engine pilot trainers.

► New 208 hp. *Boeing Helicopter*, designated *H-21B* (Army) and *HIT-2* (Navy), is modified for higher performance and better maintenance. *H-21B* includes dual gear instead of triple gear, a simplified drive installation, revised propeller section for greater visibility and interchangeability, improved throttle and engine control. New engine has a new quadricycle gear, improved thrust design, new overhauls and lighting and increased pilot visibility. The increased power (from 178 to 208 hp.) plus the light dual gear, means the *H-21B* will have a greater useful load than the *H-21A*, even with reduction of complete Army radio equipment, and will have improved speed, rate of climb and altitude performance.

► *Navy's* new runway construction program calls for standard on level length of 5,000 ft. to accommodate longer triboils of jet planes and big transports. Pardon of the longer runway for carrier fighters which operate from short carrier decks is explained by the fact that the *Forlifters*, *Bombarders*, and *fighter jets* do to come, usually get off the carrier with catapults and land with the aid of hydraulic arresting gear, neither of which is available at regular *Navy* air station runways. *Big Navy* air leaders recently told Congress members-of-parliament that it costs only two or three jet plane crashes at \$500,000 apiece on a two-hour runway to pay for its extension.

► *Norfolk's* *YB-49* jet flying wing's little publicized endurance flight back in November, 1946, still tops the record flying straight 47-hour endurance flight from *Fairbanks, Alaska*, to *Wichita* in a mileage battle. The *Norfolk* flight, on a shuttle basis between points in *California* and *Arizona*, covered 5,472 mi. at an average ground speed of 282 mph in 9 hr. 33 min. The 2,800 mi. B-47 flight was made in 5 hr. 36 min. at an average speed of 289 mph.

► *Navy* expects to use 100 million gal. of high octane aviation gasoline for its planes in fiscal 1952, and about 40 million gals. of jet fuel.





TEMCO T-35 BUCKAROO trainer, with rocket, might be used as tactical trainer.



BEECH T-34, also started out primarily as a trainer, can haul rockets or bombs.

## AF Tests Temco, Beech Trainers

Student reactions to new light T-34 and T-35 being sought as part of on-the-job evolution of planes.

A flight training evaluation test of three Temco T-35 Buckaroo trainers against two Beech T-34 trainers has started at Goodfellow AFB, Tex., where 15 USAF flight cadets are getting 150 hr basic flight training each. The three cadets assigned to each plane have been selected on the basis of identical standing for greater uniformity in the evaluation.

(Additional details on the Beech T-35 were reported in AVIATION WEEK, July 16, p. 12.)

Temco's plane is going into the next batch from a success of instrument flight training of Amer General Force headquarters personnel, at Connally AFB and San Marcos AFB, Tex.

• **Rolling the Rules.**—Servant test for the Buckaroo came at Connally when a pilot "dropped" a plane in from about 50 ft. altitude, and it bounced up a short climb into a double inverted loop. It hit the back so hard that the leading lights were broken from their mounts, then it bounced 15 ft. and landed on one wing. The pilot

swifted away and the airplane was required as two weeks and returned to service.

Despite its small size, 129 ft. 2 in. long, and 22 ft. 10 in. high, San Marcos officers and cadets stated that the plane had the characteristics of a big, light-type plane, and cadets quoted "Just like an F-81."

Student pilots at Connally and San Marcos came direct from primary training in L-16 planes, and the operators involved took, day, day, weather, flying from sheet, rough dirt landing strips, not the type of flying for which the T-35 was designed.

• **Buckaroo Performance.**—During flight tests at Connally, the three T-35 Buckaroos piled up a success record of approximately 1,000 flight hours, and showed a maintenance record comparable to other types of military aircraft in the base. Fuel consumption averaged only seven to eight gal/hr under actual service conditions, Temco reports.

The T-35s being used in the eval-

uation and training programs are Model T-35 powered by the 165 hp. Franklin engine, having a convertible semi-constant speed Aeromarine (Koppers Co.) propeller. With takeoff gross weight of 1,075 lb., the plane has a speed range of from 58 mph. max. to maximum storable dive speed of 215 mph. Does a 30-ft. obstacle it will take off in 8.5 ft. and level in 7.0 ft.

Actual version of the T-35 have been demonstrated to the U.S. armed services and to foreign governments, equipped with two 100-lb. semi-rigid rocket engines. A rocket motor installation added to the structure, will carry two 3.75-in. rockets and the wings, in addition to the guns. Rockets are equipped with an accelerometer system for firing on rocket or stress, or apogee.

The structural provisions have been developed by Temco at the company's own expense, and tested on a fleet of ten T-35s built at Temco expense.

In contrast to the growing trend toward turbine engines for military combat planes and trainers, the Temco plane is conventional aircraft type. Temco suggests the theory that a student who learns to fly conventional type, can learn to fly turbine type without the difficulty which a student who starts on turbine gear planes experiences when he returns to a tail-wheel airplane.

• **Servant Results.**—Temco officials report the following conclusions from San Marcos officers and instructors, as a result of an unofficial survey made at the base:

• **Maneuver.** The Buckaroo is well suited to the primary basic training mission. It is a military type, not a CAA type airplane, you have to fly it all the time against the better suited students, at the same time, it is not a dangerous aircraft for the average

Air Force cadet should be able to start right out on it.

• **Performance.**—The plane is well suited to the primary basic training mission, high horsepower trainer, a student with 150 hours in the T-35 should be able to step into an airplane such as the T-51 with no intermediate step.

• **Control.**—Students and pilots, in opinion of the Buckaroo's controls make it ideal for absolute work, set the controls are light so that prolonged maneuvers don't fatigue the pilot usually. The T-35 is a better instrument trainer because it has good stability. Due to quick control response the student can coordinate movements of controls with instrument readings.

• **Flight.**—The T-35 is well suited for both flying both from the standpoint of instrumentation and of lighting. It has been used extensively at San Marcos for a patrol ship on night reconnaissance.

## Atlantic Route Battle Is Opened

Trans World Airlines and Pan American World Airways have filed applications requesting that their transoceanic routes be opened, which began next July 1, be removed to make permanent.

PanAm seeks to change in the present international route structure. But TWA also the Civil Aeronautics Board to eliminate TWA from Canada and Southern Europe, especially Paris and Rome, in a return to what it calls "last competitor"—meaning competitors to the London and Lisbon airports to Europe but also competitors between the two carriers within Europe and the New York.

TWA says the new CAB policy until the President changed it as his desire for open overflying the Board's draft of the Pan-Am-TWA agreement.

Reaction to TWA's request that CAB eliminate PanAm competition from France, Italy and Spain came in a statement last Feb. letter, who said "What TWA asks is to be removed CAB from our President's policy of open competition at main traffic points, and substitute TWA's own plan for no competition."

• **Transit to Competition.**—In a letter accompanying his PAA AQA request to the President, TWA's request for competition between carriers to the big traffic points. He said: "My objective is to accomplish a route pattern in which our airline may have the benefit of competition to the principal traffic points in Europe and to avoid a monopoly on the part of either of the U.S. system (TWA and PanAm) and the Transatlantic."

Then TWA says the cities "It is apparent that as traffic points, London, Paris, Rome and the New York, are the main traffic points, the leading European cities (London, Paris, Rome, etc.) must be subjected to more and more of these points."

No TWA says PanAm, Rome and Paris and Paris TWA London and Frankfurt. TWA says also CAB is in TWA long London and Frankfurt, but to give PanAm out of Paris and Rome.

At the same time, TWA asks CAB to make decisions competitive with PanAm on things involved mostly through to Tokyo.

• **Board Overlaid.**—The CAB asked PanAm and TWA to file their own revised certificate to get the full flying before they separate next July 1. But CAB has no intention of changing the current route pattern, a reliable source says. No official Board proposals have been made. The case is completely open. Changes, if any, must come next July 1, the new PanAm-TWA agreement starts this month by

the two airlines' routes opened applications, the CAB says.

TWA asks the Board to divide Europe and the New York into two north-south wings, taking the north and south wings. This pattern is generally that way, but they develop and complete on the high density Las Vegas-Frankfurt-Rome and London-Paris-Rome lines. And TWA asks the Board for other airlines from Rome to Tokyo to meet Northwest Air line from there to give road-to-road no carrying service. TWA asks the Board to place the Rome-Stockholm route in its own service without the need of political conditions.

PanAm asks certification of the routes it now operates under temporary certificate and carriage, plus service to Casablanca and Rome.

## Subsidy Bill

Senate action expected soon on mail separation legislation.

By F. Lee Moore

The Civil Aeronautics Board will receive in detail of airline subsidy bills as Congress goes along with the bill the Senate Finance and Post Office Committee has sent to the Senate.

Committee members expect Senate debate and action within a few weeks. The House has been waiting for the Senate to act first. House may take action on July 1, but the Senate is not likely to act until the end of the session.

The Senate committee bill provides that:

• CAB would set domestic mail and

subsidy payments. Mail and rates are left up to the Board.

• Post Office would set international rates of rates of or lower than the Universal Postal Union rate. CAB would set the international subsidy rate.

The authors have found Congress might set subsidy rates, or otherwise set the general nature of the Civil Aeronautics Act of 1938, under which the airlines have operated for 15 years. The Senate committee bill makes some changes in method of subsidizing the airlines, but the basic principle, as made by the Senate, with CAB making the subsidy decisions. But Congress may give the CAB a hard time when the Board asks for its subsidy opportunities each year.

• **Bill Provision.**—Among provisions of the Senate committee bill to amend the Civil Aeronautics Act by a so-called "Air Mail Subsidy Separation Act of 1957."

• **Effective Date.** The bill would affect domestic rates next July 1 and international rates next July 1, 1957.

• **Domestic mail.** CAB would set domestic mail rates based on "the expressed costs of the mail, plus a reasonable return on investment, projected costs," and "the rate on that portion of the total investment which is used and useful in such mail service."

• **International mail.** Bill would set the DPM rate for U.S. mail in foreign, and the rate U.S. pays foreign carrier for mail service in the U.S.

• **Subsidy pay.** CAB would subsidize airlines for the purpose of "the economic development of the transportation (including the introduction of new and improved types of commercial aircraft) to the extent and of the character and quality required to promote the economic development, the national defense, and the air commerce of the United States." This amendment is making of the Act's actual compensation need for enough airline profit to develop new aircraft types, and to



AVRO DELTA CLEANED UP

the latest Avro delta wing aircraft plane, the Delta, is flying. Naturally, however, the Delta is the new version of the Delta engine or motor in the leading edge of

the wing, 70% by then stop loading, forward by a Buhlmann Derwent, the Delta is a single-engine, 12 ft. 2 in. and a fuselage length of 14 ft. 4 in.







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Biggest fusion and taps in performance, the Air Force's B-36D Superfortress bomber, built by Convair, can speed across the sky 135 miles per hour, above 50,000 feet.

## ... THERMOFLEX BLANKETS shield 4 new jets added to B-36D

Four new J-47 turbojet engines have recently been mounted under the wings of the Convair-built B-36D to nearly double the available horsepower and give this 179-ton sky giant unparalleled performance possibilities.

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## AERONAUTICAL ENGINEERING



F-89 FORMATION photo emphasizes high tail, underslung jet engines, sleek wingtip tanks, external elevator balancers.



DOWN AND OUT using the Allison J-35 engine from belly position in the F-89



UP AND IN gun balancers to check radio

## Scorpion Designed for Easy Maintenance

**Mechanics find convenient access to F-89 jet engines and avionics gear makes for quick servicing.**

Northrop's broad-winged, high-tailed F-89 Scorpion is now in service with the 78th Fighter Interceptor Group, flying intercepts over San Francisco Bay. And pilots and ground crew alike are finding out that Northrop can exceed new combat as well as break it into the deck staff.

All the more who find out, and he'll tell you the Scorpion is a good airplane. Because of security, you won't get as specific figures which would permit a reasonable comparison with Lockheed's F-94, the USAF's only other all-weather interceptor. But you will get

the most objectives and general up-grades of performance.

Not Many Birds—for one thing, the pilots bring the F-89 on a daily schedule twice in some few hours. They add the ruggedness of the plane (it's able to hold down the runway landings, the smooth landing of the deck crew) and they find the idea of having on 12-man crews in the nose for pushing holes in the canvas.

There's one breaker in the operations of the 78th, and it's no fault of the airplane. The squadron isn't up to full strength yet and the block is the one

of getting a full squadron into service soon any come from lack of trained radar operators rather than from lack of aircraft.

It takes two months of preliminary training to get a qualified operator behind one of the plane's scopes, and the AF is currently using officers in radar operations to relieve the shortage.

Four Avionics Groups were sent to the base to see the jets of the F-89, and above all, the positioning of the J-35 engines and the landing gear.

For inspection and maintenance, the engines can be swung down and out in an instant, using their own hoists, hydraulically actuated hoists.

None of the men mentioned would



PULSING AWAY, this Stearns shows under battery under board, this wing.

give a time for a complete engine change, but they all read that it is "impossible."

With the engine swung out, a mechanic can walk between the firewall and that runs the length of the fuselage.

lugs, and the engine. He can work from a standing position.

Most important, the ship does not have to be broken in half for servicing and replacement of the jets. During servicing, the hydraulic and electrical



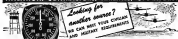
SCORPION ground arrangement drawing.

systems are kept intact, as well as being readily accessible.

Likewise, the saddle and elevator controls don't have to be broken when the engine are serviced.

► Radio Makinawaga-Archer advan-

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cases are found around the powerplant section. Now the P-49 mounts two Allison J-35-A-21s with afterburners. The seats for these engines are stationed away from the body, so that the boundary layer never enters the flow channel in the first place. Instead, it flows around a hump between the inlet and the body.

Length of the afterburner has extended the overall length of the engine housing, so that the exhaust downstream and protrudes a little aft of the wing trailing edge. And a lining of combustible dextranose and complex carbonate has been added between exhaust and fuselage skin bones. Some where along the line, external noise barriers have been added to the plane's exterior.

The Scorpion's Sunday parade is a series of 18-ton cones, located in the nose along with search light projector, gas lighting, radar gear. The cone legs in circular section, and pilot and passengers sit well aft. Even so, their down-views over the nose is better than average.

A few steel kind strip runs all from the canopy to a point just ahead of the no refuel tank.

Wing Detail—Most unusual feature of the wing design is found in the Northrop deconvolute. These air faces combine the functions of elevators and dive brakes. What appears like a normal airfoil actually is a pair of curved surfaces which operate either together or independently.

The pair opens like jaws, extending considerable area into the slipstream near the wingtip. As a result, the plane can decelerate rapidly for firing at a slower moving target, or use the cone down like an exhaust deflector for landing.

Its self sealing fuel tanks are in each wing panel, in addition to the tip tanks and some fuselage fuel.

Main landing gear struts rise the wing, because of the small thickness of the airfoil, the tires are high pressure and very thin, although of large diameter.

Landing gear housing and closing doors appear to be one of the thickest fitting jobs now in a large town.

On the Half Shell—The Scorpion's fuselage is built so hollow, the length of the section being from the aft end of the radar nose housing to about halfway between the wing and horizontal stabilizer.

After completion of the fuselage halves, they are cross-bored and moved to the rear of the fuselage production area. There they are fitted with plumbing, wiring and equipment.

Northrop had orders for 112 Scorpions before the Korean war and that number has been increased considerably since.



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## Copters Westland Wants to Make

(McGraw-Hill World News)

Yorck, England—Westland Aircraft Ltd., now producing Sikorsky S-61 and S-55 helicopters under license, recently presented its ideas of what it would like to do as its own—what engineers present.

Westland designers have suggested three designs beyond the S-55. One of these, the W50, was most likely inspired by the British Interdepartmental Helicopter Committee report (Aeronautics Week Apr. 9, 1953, p.11) which laid out a helicopter plan for rotary winged craft evolution.

• W50 Next step beyond the S-55 in size and capacity, the W50 is a 23-seater powered by two Alouette engines.

• W51 Next, apparently, Westland's design team look on the W50 as an interim plane, because it has been largely bypassed in favor of the W51. This area layout ends in designed for a cruising speed of about 120 mph, and Westland designers are counting heavily on the customer appeal of such performance. Power for the W51 is furnished by two Rolls-Royce Dart or two Armstrong Siddeley Mamba turboprops. Cock seats 32 passengers.

• W52 And for the day of the very large craft with full jet power, Westland has dreamed up the W52, a fifty-tonner capable of lifting a 15-ton load. The rotor diameter would be about 150 ft., twice that of the W50.

Westland's management admits that the feasible future will find the close relation with Sikorsky maintained. Between the demands of development and shortages of materials, Westland feels itself squeezed for experimental development.

In the meantime, Westland can choose to turn out S-51 and S-55 copies, although these are no firm orders for the time.

Westland plans to install a more powerful engine in the S-55, probably a double Alouette.

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## NACA Reports

► **Full Scale-Towed Investigation of the Static Thrust Performance of a Coaxial Helicopter Rotor (TN 2341)**—by Robert D. Harrington

This report presents the results of one portion of a general research program in progress at the Langley full-scale tunnel. The aim of the program is to investigate the aerodynamic characteristics of several different helicopter rotor configurations.

The report covers tests made of a coaxial helicopter rotor having blades tapered both in plan form and thickness ratio. Tests were made for a range of blade pitch settings and for a range of tip speed up to 260 feet per second. Several tests were also conducted to determine the effect of directional control variations on the hovering performance of the coaxial rotor.

A comparison of test results with theory is also presented; the theoretical calculations for the coaxial configurations are based on the assumption of a single rotor with a solidity equal to that of the coaxial rotor. Theory and test results are in good agreement.

► **The Effect of End Plates on Swept Wings at Low Speed (TN 2327)**—by John M. Rabe and James M. Wadsworth

The application of end plates to sweptback wings has been considered as a means of increasing some lateral stability difficulties. This report presents the results of a low-speed research program made in the Langley 300 mph, 160 ft tunnel on the effects of end plates of various sizes and shapes. For the most part, the results are for end plates on a wing of aspect ratio 2 with no taper and a sweepback of 45 deg. These are limited results for two effective sweep wings of aspect ratios 3 and 4.

Adding the end plates increased the lift curve slope in the low lift coefficient range. This slope increase tended to increase with end plate size, and could be predicted from sweep-wing end-plate theory. In general, the end plates also decreased the maximum lift-drag ratio, decreased the maximum lift-drag ratio, and slightly increased the longitudinal stability in the low lift coefficient range.

The variation of wing effective dihedral with lift coefficient was reduced appreciably by increase of end plate size. By lowering the end plate, the effective dihedral at zero lift could be changed from positive to negative. In essence, the end plates increased the directional stability of the swept wing; rearward movement of the end plates produced the same effect.

The end plates increased the tip-

type engines and greater thrust effectiveness. Free-air tests showed that end plates also increased the damping in self. In addition, end plates located below the wing chord line reduced the adverse yaw of flap type airfoils.

► On Ionization and Luminescence in Plasmas (TM 1165)—by K. Saenger, F. Goerke, and I. Reel.

In measuring the reflecting and absorbing power of the emitted jet of rockets by electrical means, the values found can be explained only by assuming gas ionization higher than that resulting from the usual equilibrium conditions. In larger rockets only a few tenths of a percent of the energy trans-

fer can be explained by ionization and thermal gas ionization. Presumably the source of the extraordinary additional heat that is present is the phenomenon of chemiluminescence (a glow produced by chemical action).

The authors suggest that their present hypothesis concerning the origin and the computing of ionization and luminescence in flames is probably not more than a preliminary attempt to give an explanation of these phenomena. At the time of the writing of the report (June 17, 1949) the authors lacked the possibility to conduct experimental investigations. They add that they submit their opinions, checked only by scanty observations, to scientific publicity as

order to stimulate further observation and experiment.

► Method for Determining Pressure Drop in Steamlines Caused Flowing in Turbulent Motion Through Constrictions and Heat Addition (TN 2538)—by M. E. Valente and R. B. Doyle.

This technical note presents charts to determine continuously the pressure drop sustained by subsonic gases (with ratio of specific heat of 5/3) flowing conditions are as described in the title, the gases are considered to be dense at high subsonic speeds.

Charts are constructed to determine pressure drops due to the addition of heat at constant wall temperatures. It is possible to determine pressure drops with good accuracy for other types of heat addition by using an effective wall temperature in connection with these charts. This effective wall temperature is given as a function of the passage diameter, gas flow conditions and gas properties over the flow passage.

The purpose of this report was to supplement earlier methods for calculating pressure drops of gases flowing through heat exchangers. These earlier methods have employed assumptions over the adequate range of conditions usually encountered. But at the high air speeds and extremely high heat input rate considered in this report, those simplifying assumptions gave appreciable errors.

Furthermore, there has been no reliable attempt recently to the use of subsonic gases in the welding field to control aircraft design cycles. One such cycle might be in connection with the nuclear energy powerplant.

The authors present examples to illustrate the use of the charts which are not the usual page size, but are large folded sheets in the back of the report.

► Loss Square Class Fitting Method With Application to the Calculation of Static Coefficient From Transient Response Data (TN 2541)—by Marvin Shulman.

In this report the author considers the problem of calculating airplane velocity from the known response of the aircraft to an arbitrary disturbance. He applies a standard least-square fitting method in order to decrease the coefficient of the linear differential equation which describes the airplane response.

The author shows that the method is applicable although cumbersome when the input is an arbitrary function of time. He then demonstrates various ways which lead to a simplification in the application of the method. Illustrative examples are given of application, which also show the practicality of the method.

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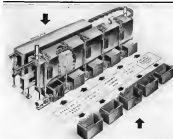
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## PRODUCTION



**FIVE-STAGE ELECTROLESS PROCESS** Cleaning work, cold water rinse, coating with warm Alodine, cold water rinse, anodized water rinse. Sketch shows two ways of using Alodine-dip tank (top) and pour tray (left).

## Easier Way to Fight Salt Spray

Alodine claimed to give better corrosion-resistance to metals than anodizing; cheaper, simpler to apply.

By ROSE H. BROWDER

Production of corrosion-resistant metal surfaces is being sped in aircraft plants by use of newer processes that are said to be more efficient and easier to apply than anodizing, which has been the method generally used.

One of these newer methods is "Alodining," developed by the American Chemical Paint Co., Ambler, Pa. Heart of this modern treatment is "Alodine," a protective coating chemical which forms a surface so chemically alloyed that it is tough, non-metallic and adheres with the metal.

Like anodizing, the Alodining process creates a surface so chemically alloyed that it is tough, non-metallic and adheres with the metal.

Like anodizing, the Alodining process creates a surface so chemically alloyed that it is tough, non-metallic and adheres with the metal.

While anodizing involves use of ox-

idizing electrolyte equipment, Alodining is a simple "dip-and-rinse" operation. Anodizing requires close control of voltage, temperature and specific purity. In Alodining, one tool does not have to be as accurate, say

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experienced users. Parts to be anodically treated must be lowered to anodes and carefully handled to handle heat with Alodining, parts (on both quantities) and whole assemblies with steel in extreme forms (damaged by rusting) can be dipped, sprayed, anodized or treated with Alodine.

According to American Chemical Paint, Alodine "is the only effective surface corrosion chemical for aluminum which lends itself to all the usual industrial applications."

Alumina-treated companies using the Alodining process are: Chrysler, Ford, General Motors, Boeing, McDonnell, Consolidated Vultures, Douglas, Cessna, Avco and A. V. Roe, Canada, among others.

The fast cold place to be extremely Alodined was a Super Cub, about four years ago. One of the first military planes was Chrysler's VTC Cub. About 90% of the Cub's metal and not a Alodine. CV, as they call it, has been using Alodine on a production basis for about two years.

Consumers in Alodining all shipped planes in production on a small scale. For the present, however, an amphibious, in direct contact with salt water, are Alodined on the inside only—no anodizing.

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Job Title No. 3250

# Feeds Automatically WITH T-J CYLINDERS



T-J Hydraulic Cylinders furnish efficient, automatic "push power" for feeding devices in this new Apex-Northrup induction forge heating equipment.

This unit—manufactured by Apex Electro-thermic Corp., Trenton, N. J.—automatically heats and forges steel forgings in sizes ranging from 1 to 4 inches (rounds or squares) at 2250°F. at rate of 7500 to 8500 lbs. per hour. Also space for heating steels... each with hydraulic cylinder and roller bearings.

**Employing T-J Cylinders.** These cylinders also operate heated bars automatically. Induction heating with this equipment results in uniformity of successive billets and in the large—thus controlling quality of finished forgings and reducing rejects.

Do you have a tough job in power movement—pushing, pulling or lifting? Let T-J help you simplify motion, save labor and cut costs by using T-J Air or Hydraulic Cylinders. Many standard sizes and styles... cushioned or non-cushioned... 100 lb. or 50,000 lb. Provisions built, long life. Write for more information. The Tomkins-Johnson Co., Jackson, Mich.

35 YEARS EXPERIENCE

**TOMKINS-JOHNSON**

HYDRAULIC AND AIR MOVEMENT EQUIPMENT • AIR MOTORS • CYLINDERS



ALUMINUM must be finished on lathe to insure which is turned by shaping.

manufacturers and AGP for Alodine.

- Low cost aluminum, easily prepared and long life.
- Simple control based on regular two-tones and simple chemical additions.
- Low heat requirements, absence of fumes, simple cycling problems.
- Shown processing three tons at once. Vought turned out more parts than 12 men formerly required for machining operations.
- Zinc chromate primer does wonders on polished parts (within five min.).

**Crack Detection.** A disadvantage of Alodine, sometimes stated by users, is that it doesn't reveal cracks in surface too well, while anodizing does automatically provide a convenient means of crack detection. However, Alodine surfaces can be tested for cracks by such methods as the Dy-Chek and Dy-Chek process. AGP thinks persons of this type should be real regardless of whether surfaces are Alodine or anodized, because it tests they afford a superior means of crack detection.

**Wet Applied-Alodine solution** is applied to aluminum at a temperature from 110 to 130°F. Alodine is dissolved with the liberation of hydrogen and an ammonia-aluminum salt is formed by chemical reaction of the surface. After 15 min. to 2 min. reaction time, depending on whether test agent is carried out in an industrial washing machine or immersion tank, the Alodine solution is removed from the bath. Here are the main steps in the process:

- Cleaning the work.
  - Rinsing the cleaned aluminum surface.
  - Coating the surface with Alodine—this usually, spray is best.
  - Rinsing with clean water, then rinsing with warm dechlorinated water.
  - Drying and then painting.
- Except for the Alodine tank itself.

# TESTING



## TESTING

Little more than cursory examination or spot checks along the production line.

but that is not good testing. Here's what BRAD FOOTE means with skilled hands using modern precision instruments test accurately, during every step of manufacture. They realize that the responsibility of satisfying you, our customers, rests primarily with them. They know that "No one does our responsibility."

• Our method of testing dimensions, hardness and soundness of metal vibrations, and smoothness of finish is part of our system of complete control. It means that the BRAD FOOTE gear you buy for use on equipment you sell to others—for use in your own shop—will give satisfactory service.

## BRAD FOOTE GEAR WORKS, Inc.

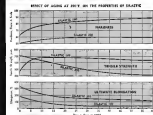
Building 2-107D • Olympic 2-7700 • 1307 South Cove Avenue  
Greenville, S.C. 29615







Long after organic rubber melts or becomes brittle...  
**SILASTIC<sup>®</sup> still stays Elastic!**



We're talking about an elastomer that retains its rubbery properties at temperatures far above and far below the limits of any other elastic material. That's indicated by the effects of accelerated aging at 250°F, on the properties of two typical Silastic sheets with brittle points in the range of -70°F to -120°F.

Silastic is being widely used at temperatures in the range of 250°F to 400°F, and at temperatures ranging from -75°F to below -100°F. It shouldn't be called a rubber because that term implies comparisons that are not valid. At room temperatures, the physical properties and abrasion resistance of Silastic are well below the values normally associated with rubber. Conversely, at temperatures well within the serviceable limits of Silastic, rubber rapidly becomes a soft gum or a brittle solid.

The important thing about Silastic is that it retains its physical, chemical and dielectric properties over a temperature span of about 400 Fahrenheit degrees. When you need rubbery properties or good dielectric properties in a synthetic and flexible material at temperatures beyond the limits of ordinary rubber, investigate Silastic.



From -100°F to +250°F  
**SILASTIC<sup>®</sup> stays Elastic**  
to -100°F.

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maneuver in the Alotone bath. This way, the coating was chemically modified so that it would dissolve in 25 to 50% nitric acid. It also was discovered that it only slightly longer processing times than are used for Alodine, that anodic coating could be removed and replaced by Alotone coating.

ACP now plans to reproduce an improved Alotone 630. This product is designed to give much better corrosion resistance to unpainted surfaces than present Alotone 150. Aluminum dipped in this new solution for 2 min. looks like it has been gold plated.

## Air Force Contracts

Contracts aggregating \$59 million by a considerable amount were announced by AMC Directorate, Procurement and Industrial Planning, during the week ended July 30. Included was 169 contracts of less than \$250,000 and 125 awards exceeding \$250,000, "over \$150,000" each. The list:

Acme Steel Co., New York, machine plates, 12, 12A, 12B, 12C, 12D, 12E, 12F, 12G, 12H, 12I, 12J, 12K, 12L, 12M, 12N, 12O, 12P, 12Q, 12R, 12S, 12T, 12U, 12V, 12W, 12X, 12Y, 12Z, 12AA, 12AB, 12AC, 12AD, 12AE, 12AF, 12AG, 12AH, 12AI, 12AJ, 12AK, 12AL, 12AM, 12AN, 12AO, 12AP, 12AQ, 12AR, 12AS, 12AT, 12AU, 12AV, 12AW, 12AX, 12AY, 12AZ, 12BA, 12BB, 12BC, 12BD, 12BE, 12BF, 12BG, 12BH, 12BI, 12BJ, 12BK, 12BL, 12BM, 12BN, 12BO, 12BP, 12BQ, 12BR, 12BS, 12BT, 12BU, 12BV, 12BW, 12BX, 12BY, 12BZ, 12CA, 12CB, 12CC, 12CD, 12CE, 12CF, 12CG, 12CH, 12CI, 12CJ, 12CK, 12CL, 12CM, 12CN, 12CO, 12CP, 12CQ, 12CR, 12CS, 12CT, 12CU, 12CV, 12CW, 12CX, 12CY, 12CZ, 12DA, 12DB, 12DC, 12DD, 12DE, 12DF, 12DG, 12DH, 12DI, 12DJ, 12DK, 12DL, 12DM, 12DN, 12DO, 12DP, 12DQ, 12DR, 12DS, 12DT, 12DU, 12DV, 12DW, 12DX, 12DY, 12DZ, 12EA, 12EB, 12EC, 12ED, 12EE, 12EF, 12EG, 12EH, 12EI, 12EJ, 12EK, 12EL, 12EM, 12EN, 12EO, 12EP, 12EQ, 12ER, 12ES, 12ET, 12EU, 12EV, 12EW, 12EX, 12EY, 12EZ, 12FA, 12FB, 12FC, 12FD, 12FE, 12FF, 12FG, 12FH, 12FI, 12FJ, 12FK, 12FL, 12FM, 12FN, 12FO, 12FP, 12FQ, 12FR, 12FS, 12FT, 12FU, 12FV, 12FW, 12FX, 12FY, 12FZ, 12GA, 12GB, 12GC, 12GD, 12GE, 12GF, 12GG, 12GH, 12GI, 12GJ, 12GK, 12GL, 12GM, 12GN, 12GO, 12GP, 12GQ, 12GR, 12GS, 12GT, 12GU, 12GV, 12GW, 12GX, 12GY, 12GZ, 12HA, 12HB, 12HC, 12HD, 12HE, 12HF, 12HG, 12HH, 12HI, 12HJ, 12HK, 12HL, 12HM, 12HN, 12HO, 12HP, 12HQ, 12HR, 12HS, 12HT, 12HU, 12HV, 12HW, 12HX, 12HY, 12HZ, 12IA, 12IB, 12IC, 12ID, 12IE, 12IF, 12IG, 12IH, 12II, 12IJ, 12IK, 12IL, 12IM, 12IN, 12IO, 12IP, 12IQ, 12IR, 12IS, 12IT, 12IU, 12IV, 12IW, 12IX, 12IY, 12IZ, 12JA, 12JB, 12JC, 12JD, 12JE, 12JF, 12JG, 12JH, 12JI, 12JJ, 12JK, 12JL, 12JM, 12JN, 12JO, 12JP, 12JQ, 12JR, 12JS, 12JT, 12JU, 12JV, 12JW, 12JX, 12JY, 12JZ, 12KA, 12KB, 12KC, 12KD, 12KE, 12KF, 12KG, 12KH, 12KI, 12KJ, 12KK, 12KL, 12KM, 12KN, 12KO, 12KP, 12KQ, 12KR, 12KS, 12KT, 12KU, 12KV, 12KW, 12KX, 12KY, 12KZ, 12LA, 12LB, 12LC, 12LD, 12LE, 12LF, 12LG, 12LH, 12LI, 12LJ, 12LK, 12LL, 12LM, 12LN, 12LO, 12LP, 12LQ, 12LR, 12LS, 12LT, 12LU, 12LV, 12LW, 12LX, 12LY, 12LZ, 12MA, 12MB, 12MC, 12MD, 12ME, 12MF, 12MG, 12MH, 12MI, 12MJ, 12MK, 12ML, 12MN, 12MO, 12MP, 12MQ, 12MR, 12MS, 12MT, 12MU, 12MV, 12MW, 12MX, 12MY, 12MZ, 12NA, 12NB, 12NC, 12ND, 12NE, 12NF, 12NG, 12NH, 12NI, 12NJ, 12NK, 12NL, 12NM, 12NN, 12NO, 12NP, 12NQ, 12NR, 12NS, 12NT, 12NU, 12NV, 12NW, 12NX, 12NY, 12NZ, 12OA, 12OB, 12OC, 12OD, 12OE, 12OF, 12OG, 12OH, 12OI, 12OJ, 12OK, 12OL, 12OM, 12ON, 12OO, 12OP, 12OQ, 12OR, 12OS, 12OT, 12OU, 12OV, 12OW, 12OX, 12OY, 12OZ, 12PA, 12PB, 12PC, 12PD, 12PE, 12PF, 12PG, 12PH, 12PI, 12PJ, 12PK, 12PL, 12PM, 12PN, 12PO, 12PP, 12PQ, 12PR, 12PS, 12PT, 12PU, 12PV, 12PW, 12PX, 12PY, 12PZ, 12QA, 12QB, 12QC, 12QD, 12QE, 12QF, 12QG, 12QH, 12QI, 12QJ, 12QK, 12QL, 12QM, 12QN, 12QO, 12QP, 12QQ, 12QR, 12QS, 12QT, 12QU, 12QV, 12QW, 12QX, 12QY, 12QZ, 12RA, 12RB, 12RC, 12RD, 12RE, 12RF, 12RG, 12RH, 12RI, 12RJ, 12RK, 12RL, 12RM, 12RN, 12RO, 12RP, 12RQ, 12RR, 12RS, 12RT, 12RU, 12RV, 12RW, 12RX, 12RY, 12RZ, 12SA, 12SB, 12SC, 12SD, 12SE, 12SF, 12SG, 12SH, 12SI, 12SJ, 12SK, 12SL, 12SM, 12SN, 12SO, 12SP, 12SQ, 12SR, 12SS, 12ST, 12SU, 12SV, 12SW, 12SX, 12SY, 12SZ, 12TA, 12TB, 12TC, 12TD, 12TE, 12TF, 12TG, 12TH, 12TI, 12TJ, 12TK, 12TL, 12TM, 12TN, 12TO, 12TP, 12TQ, 12TR, 12TS, 12TT, 12TU, 12TV, 12TW, 12TX, 12TY, 12TZ, 12UA, 12UB, 12UC, 12UD, 12UE, 12UF, 12UG, 12UH, 12UI, 12UJ, 12UK, 12UL, 12UM, 12UN, 12UO, 12UP, 12UQ, 12UR, 12US, 12UT, 12UU, 12UV, 12UW, 12UX, 12UY, 12UZ, 12VA, 12VB, 12VC, 12VD, 12VE, 12VF, 12VG, 12VH, 12VI, 12VJ, 12VK, 12VL, 12VM, 12VN, 12VO, 12VP, 12VQ, 12VR, 12VS, 12VT, 12VU, 12VV, 12VW, 12VX, 12VY, 12VZ, 12WA, 12WB, 12WC, 12WD, 12WE, 12WF, 12WG, 12WH, 12WI, 12WJ, 12WK, 12WL, 12WM, 12WN, 12WO, 12WP, 12WQ, 12WR, 12WS, 12WT, 12WU, 12WV, 12WW, 12WX, 12WY, 12WZ, 12XA, 12XB, 12XC, 12XD, 12XE, 12XF, 12XG, 12XH, 12XI, 12XJ, 12XK, 12XL, 12XM, 12XN, 12XO, 12XP, 12XQ, 12XR, 12XS, 12XT, 12XU, 12XV, 12XW, 12XX, 12XY, 12XZ, 12YA, 12YB, 12YC, 12YD, 12YE, 12YF, 12YG, 12YH, 12YI, 12YJ, 12YK, 12YL, 12YM, 12YN, 12YO, 12YP, 12YQ, 12YR, 12YS, 12YT, 12YU, 12YV, 12YW, 12YX, 12YY, 12YZ, 12ZA, 12ZB, 12ZC, 12ZD, 12ZE, 12ZF, 12ZG, 12ZH, 12ZI, 12ZJ, 12ZK, 12ZL, 12ZM, 12ZN, 12ZO, 12ZP, 12ZQ, 12ZR, 12ZS, 12ZT, 12ZU, 12ZV, 12ZW, 12ZX, 12ZY, 12ZZ.

Adair Communications Lab., New York, 12A, 12B, 12C, 12D, 12E, 12F, 12G, 12H, 12I, 12J, 12K, 12L, 12M, 12N, 12O, 12P, 12Q, 12R, 12S, 12T, 12U, 12V, 12W, 12X, 12Y, 12Z, 12AA, 12AB, 12AC, 12AD, 12AE, 12AF, 12AG, 12AH, 12AI, 12AJ, 12AK, 12AL, 12AM, 12AN, 12AO, 12AP, 12AQ, 12AR, 12AS, 12AT, 12AU, 12AV, 12AW, 12AX, 12AY, 12AZ, 12BA, 12BB, 12BC, 12BD, 12BE, 12BF, 12BG, 12BH, 12BI, 12BJ, 12BK, 12BL, 12BM, 12BN, 12BO, 12BP, 12BQ, 12BR, 12BS, 12BT, 12BU, 12BV, 12BW, 12BX, 12BY, 12BZ, 12CA, 12CB, 12CC, 12CD, 12CE, 12CF, 12CG, 12CH, 12CI, 12CJ, 12CK, 12CL, 12CM, 12CN, 12CO, 12CP, 12CQ, 12CR, 12CS, 12CT, 12CU, 12CV, 12CW, 12CX, 12CY, 12CZ, 12DA, 12DB, 12DC, 12DD, 12DE, 12DF, 12DG, 12DH, 12DI, 12DJ, 12DK, 12DL, 12DM, 12DN, 12DO, 12DP, 12DQ, 12DR, 12DS, 12DT, 12DU, 12DV, 12DW, 12DX, 12DY, 12DZ, 12EA, 12EB, 12EC, 12ED, 12EE, 12EF, 12EG, 12EH, 12EI, 12EJ, 12EK, 12EL, 12EM, 12EN, 12EO, 12EP, 12EQ, 12ER, 12ES, 12ET, 12EU, 12EV, 12EW, 12EX, 12EY, 12EZ, 12FA, 12FB, 12FC, 12FD, 12FE, 12FF, 12FG, 12FH, 12FI, 12FJ, 12FK, 12FL, 12FM, 12FN, 12FO, 12FP, 12FQ, 12FR, 12FS, 12FT, 12FU, 12FV, 12FW, 12FX, 12FY, 12FZ, 12GA, 12GB, 12GC, 12GD, 12GE, 12GF, 12GG, 12GH, 12GI, 12GJ, 12GK, 12GL, 12GM, 12GN, 12GO, 12GP, 12GQ, 12GR, 12GS, 12GT, 12GU, 12GV, 12GW, 12GX, 12GY, 12GZ, 12HA, 12HB, 12HC, 12HD, 12HE, 12HF, 12HG, 12HH, 12HI, 12HJ, 12HK, 12HL, 12HM, 12HN, 12HO, 12HP, 12HQ, 12HR, 12HS, 12HT, 12HU, 12HV, 12HW, 12HX, 12HY, 12HZ, 12IA, 12IB, 12IC, 12ID, 12IE, 12IF, 12IG, 12IH, 12II, 12IJ, 12IK, 12IL, 12IM, 12IN, 12IO, 12IP, 12IQ, 12IR, 12IS, 12IT, 12IU, 12IV, 12IW, 12IX, 12IY, 12IZ, 12JA, 12JB, 12JC, 12JD, 12JE, 12JF, 12JG, 12JH, 12JI, 12JJ, 12JK, 12JL, 12JM, 12JN, 12JO, 12JP, 12JQ, 12JR, 12JS, 12JT, 12JU, 12JV, 12JW, 12JX, 12JY, 12JZ, 12KA, 12KB, 12KC, 12KD, 12KE, 12KF, 12KG, 12KH, 12KI, 12KJ, 12KK, 12KL, 12KM, 12KN, 12KO, 12KP, 12KQ, 12KR, 12KS, 12KT, 12KU, 12KV, 12KW, 12KX, 12KY, 12KZ, 12LA, 12LB, 12LC, 12LD, 12LE, 12LF, 12LG, 12LH, 12LI, 12LJ, 12LK, 12LM, 12LN, 12LO, 12LP, 12LQ, 12LR, 12LS, 12LT, 12LU, 12LV, 12LW, 12LX, 12LY, 12LZ, 12MA, 12MB, 12MC, 12MD, 12ME, 12MF, 12MG, 12MH, 12MI, 12MJ, 12MK, 12ML, 12MN, 12MO, 12MP, 12MQ, 12MR, 12MS, 12MT, 12MU, 12MV, 12MW, 12MX, 12MY, 12MZ, 12NA, 12NB, 12NC, 12ND, 12NE, 12NF, 12NG, 12NH, 12NI, 12NJ, 12NK, 12NL, 12NM, 12NN, 12NO, 12NP, 12NQ, 12NR, 12NS, 12NT, 12NU, 12NV, 12NW, 12NX, 12NY, 12NZ, 12OA, 12OB, 12OC, 12OD, 12OE, 12OF, 12OG, 12OH, 12OI, 12OJ, 12OK, 12OL, 12OM, 12ON, 12OO, 12OP, 12OQ, 12OR, 12OS, 12OT, 12OU, 12OV, 12OW, 12OX, 12OY, 12OZ, 12PA, 12PB, 12PC, 12PD, 12PE, 12PF, 12PG, 12PH, 12PI, 12PJ, 12PK, 12PL, 12PM, 12PN, 12PO, 12PP, 12PQ, 12PR, 12PS, 12PT, 12PU, 12PV, 12PW, 12PX, 12PY, 12PZ, 12QA, 12QB, 12QC, 12QD, 12QE, 12QF, 12QG, 12QH, 12QI, 12QJ, 12QK, 12QL, 12QM, 12QN, 12QO, 12QP, 12QQ, 12QR, 12QS, 12QT, 12QU, 12QV, 12QW, 12QX, 12QY, 12QZ, 12RA, 12RB, 12RC, 12RD, 12RE, 12RF, 12RG, 12RH, 12RI, 12RJ, 12RK, 12RL, 12RM, 12RN, 12RO, 12RP, 12RQ, 12RR, 12RS, 12RT, 12RU, 12RV, 12RW, 12RX, 12RY, 12RZ, 12SA, 12SB, 12SC, 12SD, 12SE, 12SF, 12SG, 12SH, 12SI, 12SJ, 12SK, 12SL, 12SM, 12SN, 12SO, 12SP, 12SQ, 12SR, 12SS, 12ST, 12SU, 12SV, 12SW, 12SX, 12SY, 12SZ, 12TA, 12TB, 12TC, 12TD, 12TE, 12TF, 12TG, 12TH, 12TI, 12TJ, 12TK, 12TL, 12TM, 12TN, 12TO, 12TP, 12TQ, 12TR, 12TS, 12TT, 12TU, 12TV, 12TW, 12TX, 12TY, 12TZ, 12UA, 12UB, 12UC, 12UD, 12UE, 12UF, 12UG, 12UH, 12UI, 12UJ, 12UK, 12UL, 12UM, 12UN, 12UO, 12UP, 12UQ, 12UR, 12US, 12UT, 12UU, 12UV, 12UW, 12UX, 12UY, 12UZ, 12VA, 12VB, 12VC, 12VD, 12VE, 12VF, 12VG, 12VH, 12VI, 12VJ, 12VK, 12VL, 12VM, 12VN, 12VO, 12VP, 12VQ, 12VR, 12VS, 12VT, 12VU, 12VV, 12VW, 12VX, 12VY, 12VZ, 12WA, 12WB, 12WC, 12WD, 12WE, 12WF, 12WG, 12WH, 12WI, 12WJ, 12WK, 12WL, 12WM, 12WN, 12WO, 12WP, 12WQ, 12WR, 12WS, 12WT, 12WU, 12WV, 12WW, 12WX, 12WY, 12WZ, 12XA, 12XB, 12XC, 12XD, 12XE, 12XF, 12XG, 12XH, 12XI, 12XJ, 12XK, 12XL, 12XM, 12XN, 12XO, 12XP, 12XQ, 12XR, 12XS, 12XT, 12XU, 12XV, 12XW, 12XX, 12XY, 12XZ, 12YA, 12YB, 12YC, 12YD, 12YE, 12YF, 12YG, 12YH, 12YI, 12YJ, 12YK, 12YL, 12YM, 12YN, 12YO, 12YP, 12YQ, 12YR, 12YS, 12YT, 12YU, 12YV, 12YW, 12YX, 12YY, 12YZ, 12ZA, 12ZB, 12ZC, 12ZD, 12ZE, 12ZF, 12ZG, 12ZH, 12ZI, 12ZJ, 12ZK, 12ZL, 12ZM, 12ZN, 12ZO, 12ZP, 12ZQ, 12ZR, 12ZS, 12ZT, 12ZU, 12ZV, 12ZW, 12ZX, 12ZY, 12ZZ.

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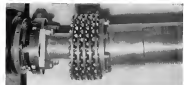




## EQUIPMENT



UNIVERSAL DRIVE SHAFT for remote coupling of engine accessories in exploded view.



RESILIENT DRIVESHAFT ASSEMBLY absorbs angular displacement of shaft joint

## New Remote Driveshaft is Light

Universal high-speed unit offers many advantages for transmission of power to aircraft accessories.

By George E. Christian

Titusville, N. J.—A new high-speed universal drive shaft to permit remote coupling of engine drive accessories will soon appear on the equipment market. Used in capable of transmitting over 300 hp at 9,000 rpm, with angular misalignments of  $\pm 15$  deg and axial movement of  $\pm 1$  in.

The flexible coupling designed and manufactured by Eclipse-Power division of Bendix Aviation Corp., has aerospace engineers laboratory tests for more months and will be ready for production in the near future, according to B. W. Goldberg, chief, with Henry Friesco, a joint project engineer of the device.

- **Advantages**—Many advantages accrue from remotely locating individual or groups of accessories.
- They are not subjected to the constant (and possibly violent) vibrations of the powerplant.
- Accessibility for servicing or replacement often may be readily improved.
- Drivetrain moments imposed on engine are reduced—and this is an important factor in electrical requirements of modern aircraft, one, resulting in large and heavy ac and dc generators.

Key to the ingenious design is a series of flexible steel driveshafts twisted together and mounted on each end of a shaft. These absorb angular deflections and result in a joint with constant

velocity characteristics. Of hyperbolic cross section, the driveshafts form an "X" designed as to provide for substantially uniform torsional and bending stresses across the entire working area. Thus, coupled with the fact that no energy is lost to sliding or rolling friction in the torque-transmitting member results in an especially efficient and long-life drive unit.

Of simple straightforward design, the shaft is made up of two constant velocity joints spaced to the ends of a long central shaft. Angular displacement of the joint is absorbed by flexure of the resilient driveshafts. Each joint is specially made up of four thin, circular, duct, forged members.

- **Light, Safe and Versatile**—Other features of the Eclipse flexible drive which will appeal to the aircraft industry are:
  - **It is light**—Indication of the weight the drive can use is that the Navy, in its spec, allowed Eclipse 90 lb. to build a flexible coupling, capable of transmitting 300 hp.
  - **The complete Eclipse unit weighs in at 50 lb.** Load-carrying members of a 300-hp unit (only 4) is in its size and weighs 14 lb. assembled.

► **It is safe**. Should the only driving parts—the driveshafts—fail, the unit will fall into. There no longer will be any power transmission, but the failed unit will not whip and fall around in the accessory section to cause damage, as is feared. The rotating safety device is a pre-erected ball mounted continuously in the hub of the driveshafts assembly about which are the failed flexible drive members will be forced to rotate. Second function of the ball, under normal operating conditions when the joint sample wobbles about the ball, it is possible during initial shakedown. Moreover, there is no oil leakage and the shaft is free from lock bolts in place.

► **It is versatile**. The joint may be made in any size and in almost any configuration. It may be equipped with angular gear box drives to place the accessory in any desired part of the engine nacelle. Goldberg and units capable of transmitting high hp, were as preferable to manufacturers of small drives to operate generators, pumps or superchargers. A disconnect may be included in drive design to allow stopping the driven members without halting the power source. Clutch action, specially added to both ends of the intermediate coupling between the two end joints, allow the shaft to be disengaged quickly and with little effort. Thus drive length may be altered.

Due to the simplicity of the unit, balancing problems are minimized and

the shaft is silent in operation. Eclipse kept the maintenance man in mind when designing the joint. Under all operating conditions there has been no perceptible bearing of the unit. And, while current units do pay for labor costs at engine overhaul periods, future designs now under consideration will require little or no oil. Goldberg says that the USAF has tested a small and expressed satisfaction with its performance. Currently, an engine manufacturer is evaluating one.

## Five Locals Convert DC-3 to 28 Seats

Five local service airlines have awarded high-density passenger seating contracts to Davis Aero Inc. for conversion of DC-3s to 28 passengers. The airlines are Frontier, Eastern, Continental, Robinson and Southern.

Company president Steve Davis says the 28-seat configuration actually requires less than the original 21, yet the 28 still provides heavy seating.

Installation is simplified by use of integral tracks or floor channels to cut time and expense of floor fitting modifications. It also gives flexibility of seating arrangements. Neither floor nor rear bulkhead of the DC-3 bulge as moved.

Another high-density seating contract now completed by Davis is 100-passenger DC-4 conversions for Flying Tiger Line, the company says. This is used between Puerto Rico and New York on charter.



## BATTERY WATER DISTILLERS

These water refiners and demineralizers are easily installed by United Air Lines in its 25-passenger DC-3s. The cost of distilled water, the airline says. Water is used for batteries and water injection systems. United says it is the best drink to use the battery and demineralizers also drink to purely ordinary tap water.

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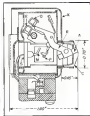
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## New Magnetic Fire Detector

A new type of magnetic fire detector which reacts itself automatically in an alarming test by the Civil Aeronautics Administration to determine its suitability for U. S. aircraft installation. Key to action of the new system, made by Corvair Mfg. Co., Ltd., is the effect of heat on magnetic characteristic of metal. Many loss their magnetic property when heated above a critical temperature, the Curie point, and magnet it when the temperature drops below that point. The Curie point is a constant for each metal.

How it Works—A small bar magnet (a), insulated as an externally balanced magnet (b), is normally attracted to and in contact with cup and temperature-sensing element (c). When temperature of sensing element rises to Curie point, it no longer attracts the magnet and acts as its keeper. Now the repelling force between movable magnet (d), and fixed magnet (a), is sufficient to rotate crank (e) (g), bridges one circuit (a). The completed circuit may be used to activate any fire protection device in the airplane.

Automatic Resetting—When temperature falls below Curie point of cup, its attraction to magnet (b), is sufficient to overcome repelling force of other two magnets and return crank to its original position, breaking the circuit between bridge plate and contacts.

Patented test is simple. Placing a small bar magnet at Point X will cause crank to pivot and close contact points. The switch is hermetically sealed in a non-welded stainless steel case. Electric wires are fed through the case by metal-Nippon bonded seals. The detector is manufactured by a British firm. Sole U. S. distributors are Skunkhead Aero Company, Inc., Tarrytown, N. Y.

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Vice-President of Operations

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U. S. down the west coast of South America to Buenos Aires is eloquent testimony to the absolute dependability of Champion Aircraft Spark Plugs. As Mr. Kirkland's letter states: That's why the majority of air lines—the world's most discriminating spark plug buyers—specify Champions.

Panagra's DC-6's International at Des Moines Airport, Iowa. From its International Base down the west coast of South America to Buenos Aires, Argentina, daily via Panama, Guayaquil, Quito, and Santiago.



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Champion Spark Plug Company  
Toledo 3, Ohio

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*Thomas J. Kirkland*  
Thomas J. Kirkland  
Vice President - Operations



## NEW AVIATION PRODUCTS



### Sealed Plane Plugs

Hermetically sealed plugs for use with aircraft rings and other similar components now are being produced in 21 different types by Conaco Electric.

Comprising the firm's "RS" series, the plugs are rubber sealed, are supplied in complete assemblies and have provision for permanent mounting to a nut or chassis. They are built to MIL-C-5015 specifications and conform to AN21945 under "Sealed" classification "D." Some have coupling nuts (bronze type), others plain barrels, less coupling nuts.

Hermetic sealing, high mechanical resistance and dielectric strength is achieved through use of special resilient (polyethylene) rubber inserts. These insert AN-type brass contact pins which are non-rotating in the insert and non-removable. Contacts larger than No. 8 are not available because of heat required for soldering operation. Short solder joints are provided to afford the electrical contact dimensions of plug and component. Regardless of type required, RS plugs meet with standard AN installation having corresponding inserts, the company says.

Conaco Electric Development Co., 8109 Hamblett St., Los Angeles 31.



### Smaller Bearings

To meet instrumentation demands, spring-tempered "Mitsui" ball bearings now are being produced in a smaller size.

The new bearing is built to give low and uniform values of starting and load-carrying torque. These ball in the

range of 6006 is an under a standard and 75 gram thrust load, the maker says. Bearings are supplied by individual stainless steel coil springs. The part measures 5/16 (diam.) x 7/16 in. (width) to tolerance ASBEC 5 and highest Rings and balls are available in high-carbon chrome steel and stainless AISI440.

New Hampshire Ball Bearings, Inc., Peterborough, N. H.



### Runway Lights

The Air Force has ordered 17,900 new model high-intensity runway lights—enough to bypass more than 700 mi. of runway-lanes Westinghouse.

The light is a bi-directional type. It is designed to give better coverage in the "region of shadows" area at airports to insure other aircraft landings, according to the firm. Westinghouse developed the light in cooperation with Kopp Glass, Inc. It is built to meet requirements of CAA Specification L-127.

The unit has a tungsten, 160-deg. glass lens. The diaphragm light has two main lenses up and down the runway. The lens also spreads "off runway" light for circling procedure. Source is the 200-watt, 2-6 amp., E-14 high-pressure sodium lamp. Westinghouse stresses three features:

- Positive photoelectric control is provided with new type one-pass lens.
- Easy hooking and shifting. Optical system can be adjusted up to first day from installed in any direction by four screws. Positive sight facilitates day-light alignment.
- Internal coils (then are located inside one-piece lens, eliminate hand-unscrewing from direct contact with lens, dirt and snow.

The light consists essentially of an optical assembly and lens holder rigidly mounted on a support. A adjustable coupling connects the diaphragm to



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the base plate. A plug and receptacle provide an electrical connection between a transformer in the base and the longholder. The base normally used conforms to CAA Spec L-809. It is designed for installation in the earth with a concrete backfill. It contains a transformer conforming to CAA Spec L-806, rated 200v., 5,000w., 6.6 amp., 60c and designed for use in a series circuit supplied by not larger than a 250w. constant current regulator with high-voltage control. Waterproofing permits use of it possible to install the new light on the bases of existing fresh control lights to be replaced provided there is sufficient space for the base housing.

Wichagor Electric Corp., Box 2099, Pittsburgh 10

### All-Weather Switches

Scaled, precision snap action switches specially suited for use in air currents to aircraft where equipment is exposed to ice, water, oil and dirt have been placed on the market by Merr Switch.

A single unit consists of two SPST Merr type V1 switches which are actuated mechanically for double pole double throw control. It has a sealed enclosure of die cast aluminum alloy, anodized and painted inside and out, with non-flammable powder Synthetic rubber "O" ring seal the cover and shaft openings.

One switch I.E.M. has a plunger-type actuator, weighs 8 oz. Another, I.E.M., has a rotating shaft adjustable to any of 35 positions through 360 deg. It weighs 9 oz.

Merr Switch Division of Merrapac Heavy Equipment Co., Fairport, N.Y.

### ALSO ON THE MARKET

Paint for aircraft aluminum surfaces, "Alum," strongly adheres to aluminum without priming, and only requires surface pre-treatment in water, very developed. Results still spray, silk, fields, hydraulic fluid. Chemtreat Aviation, Inc., Akron 9

Electrical insulating tubing of plastic and braided glass fibers can be treated and knitted, provides standard standards at same price as copper-based products, two products, Insulite, Fluor-Myl Co., Coshohocken, Pa.

RA-42 fog preventive can be applied to aircraft windshields or goggles to prevent formation of mist. Effective up to 30 days, product won't dissolve, even clear windshield wipers and is applied by spraying with atomizer, says Insulite, Regal Air Corp., 500 Fifth Ave., New York.

UP THERE WITH THE BIG NAMES...CHAPTER NUMBER 6



## SKYDROL stars with NATIONAL'S Star

Pioneers winging their way between New York and Miami or Havana via National, "Airlines of the future" enjoy DC-6's luxury PLUS. Among other things, "PLUS" means the extra safety of Skydrol, Monsanto's first-constant-type hydraulic fluid.

Superchargers on National's luxurious DC-6's carry Skydrol. Skydrol will be the superchargers of the airline's new DC-8's, which are on order. Every airline flying DC-6's now uses Skydrol or as converting to it.

Skydrol brings greater safety to passengers, crews and ships in flight — greater safety to maintenance men and multimillion-dollar equipment on the ground. The fluid's Skydrol eliminates the possibility of fires due to

leakage of hydraulic lines. Because Skydrol has exceptional stability, it brings savings in maintenance costs.

Write for a copy of the booklet, "More Safety in the Air with Monsanto's Skydrol." Consider the advantages Skydrol offers. See if you don't agree that it's wise to switch to Skydrol. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 S. Second St., St. Louis 8, Mo.

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## Sub Smasher

One of the most completely electronically equipped planes ever built, the U. S. Navy's new Martin P5M-1 Marlin is a deadly anti-submarine weapon designed to detect surfaced and snorkeling submarines. And, once the sub has been located, the Marlin carries the killing punch in its bomb bays to destroy the enemy raider.

The big seaplane's features—many of them still secret—are a product of teamwork among Navy, BuAer, N. A. C. A., and Martin aircraft systems engineering. Long, extended hull for greater water stability—close, streamlined profile for higher speed—hydro-flaps for fast stops and quick turns in tacking—all contribute to the superior performance that will aid the Navy in keeping war seaplanes swept clean of underwater raiders.

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THE GEORGE L. MARTIN COMPANY, Baltimore 3, Md.

## AIR TRANSPORT

### Revolt of the Pilots—III

## ALPA Being Re-cast as New-Type Union

Members to exercise direct control of policy and administration.

By William Kruger

The Air Line Pilots Assn., as being re-organized to give both members and airline management a union such as never before seen among pilots. In some respects it may be unlike any other union. It will be the operation of the union that will make ALPA different, and it is this operation that management will have to know to chart future relations with the union.

Any change from the one man operation of David L. Behrman is high drama in itself. The plot is interrupted by what the new leaders at ALPA plan to do. In an administrative sense, they will attempt to create a new Air Line Pilots Assn.

► **Protest**—The steps was set by the report of the special investigating committee which touched off the pilots' revolt (Aeronautics, Aug. 15, p. 71). In the preface to the report, the 50-man policy writer:

"The committee feels that the chief purpose of any labor representing organization should be to provide the maximum of representation possible at a reasonable cost. That can be achieved only by having an efficient professional organization plus a well-informed, alert and interested membership which takes an active part in the work of the organization. Factors of the organization should reflect the needs of the members, and these policies should be acted upon from time to time through democratic processes in order that their policies can be kept abreast of the times."

"There should be a good system of communication between the membership and the professional organization in order that the professional organization may continually be aware of the needs of the membership, and the membership may be aware of the functions of the professional organization. Provisions should be made for continuous representation, participation of the membership in policy formation, education, activities and enforcement."

► **Self-help**—Behrman was ousted not because he wasn't doing enough for pilots, but because he did just send the pilots to do enough for themselves. It is significant that Behrman's actions



MEN AROUND SATIN: James E. Wood (upper left), first vice president, W. T. Reiter, (upper right) regional vice president at Miami, M. A. F. Fitter (lower left), regional vice president at New York, J. P. Tolson (lower right), chairman of the airline committee.



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on behalf of pilots have not been indicated by the pilots. After the board of directors met, ALPA had two presidents. James H. Wood stated a statement which said in part:

"Every man who flies for a living owes the Beltsville a debt of gratitude which can never adequately be repaid."

"He should and will go down in history as one of the great men in aviation who will be honored with reverence and respect by flying men throughout the world, until the end of time."

That was not wonder-working. Some time later Wood and presently, "I must close with you that statement, and I mean it now." Yet, he is one of the most active members in re-opening the association.

Actually, what happened within ALPA is a situation of a world in which people everywhere are getting acquainted with entrenched authority and want to take a more active role in their own affairs. This is something Beltsville could not understand, but it is evident and understood why his ALPA was not the democracy he always and it was, while the new ALPA will come closer to being so.

**Beltsville vs. Democracy.** Beltsville's ALPA was a republic form of government, with an elected body, the board of directors, speaking for the members. The new ALPA, while retaining the board of directors, will put actual direction of the association in an Executive Committee dominated by active line pilots. In effect, the association will directly govern the association.

That the new officials of the union appreciate this subtle difference between a democracy and a republic is apparent by three repeated declarations of their plan as "democratic," and the details of the plan itself.

Subject to a constitutional convention to revise the bylaws, here are the outstanding elements of the proposal to "democratize" ALPA.

• Continuous membership requirements on the modification of ALPA policy.

• Adequate communication between ALPA headquarters and the field.

• Membership for one-time pilot pay.

• Regional offices-in addition to getting the government of the association out into the field, the new ALPA officials intend to get much of the administration out into the field.

One of the proposals by line indicates the role of this group.

"The Executive Committee shall attend all conventions and meetings of the executive board. It shall be charged with carrying out the plan presented to the association. It shall be charged with furthering the objectives and policies announced by the conven-

## Special Report

What's behind the change in leadership of the Air Line Pilots Assn., and what does it mean? The reform and entry and organized labor have been studying that question ever since early last July morning when David L. Beltsville was laid to rest. Beltsville, from his presidency of the union for seven years, was a member of Chicago's union, as well as with ALPA's officials and employees, and obtained the only complete interview Beltsville has given on the association dispute. The result is a special report, in four weekly installments which began Aug. 6. The third of the series appears on these pages.

tion and the executive board. It shall recommend policies to the convention and the executive board and shall recommend changes in policies previously set forth. It shall be charged with seeing in the capacity of a union's representative and the general leadership of the association's business and health. It shall retain the president's selection of staff members and department heads, and on such employees that be placed on the executive payroll until their selection has been so ratified."

The Executive Committee would be composed of the president, first vice president, executive vice president, secretary-treasurer, and first regional vice president. These five would replace the present 17 regional vice presidents. On the surface, that appears to be narrowing pilot representation, rather than widening it. But there are two other factors to consider.

In the first place, these two vice presidents will represent geographical regions each having approximately the same total population. Second, the present 17 regional vice presidents have no authority or duties other than what may be assigned them from time to time by the president. The new regional vice presidents would manage the association.

• Regional Offices-In addition to getting the government of the association out into the field, the new ALPA officials intend to get much of the administration out into the field. Regional offices would be established at Miami, New York and San Francisco, and the present Washington office would be greatly strengthened.

Each of the three regional offices would be directed by a full-time employee trained as a negotiator. He would negotiate working agreements with the

unions on his own, administer the agreements, attempt to settle differences before they get to the grievance stage, and initiate grievance through the central board.

The Washington office would be a headquarters in matters. It would have a full-time attorney, engineers, and other specialized people. While performing the several functions of a Washington office—maintaining legislative and government contacts, reporting on government actions, and the like—it would have one new, important duty. It would catalog the specialized knowledge of pilots in the area so it would always have available experts to testify for ALPA at the various congressional and government hearings, and represent the union on technical committees.

ALPA officials are hard of finding out that the association's membership is chock-full of engineers, physicists, astronomers and experienced members of every profession and service. If those men are properly used, ALPA expects its

technical representation to be among the best in their various fields. For example, ALPA was represented on both the Senate and House subcommittees on Beltsville's death.

There is one danger in this diagram of administration and responsibility, particularly as an expansion of such wholeness such as the pilots. Beltsville put his finger on it when he said "They are setting up three little ALPAs." He doesn't think the regional system will work, that the coordination job will be too great. With lack of tight coordination and integration from headquarters, the regional directors could drift off into policies and responsibilities of their own.

The pilots sitting up the system diagram that possibility. They say regional directors are badly needed, and will see the union's way. For example, they say, these were two previous ones in Miami and seven previous ones in Chicago sent down a negotiator. One of the cases had to be postponed, so the headquarters man returned to Chicago,

and had to go to Miami again at a later date—all at the union's expense.

The coordination job will be simple, it is claimed. "What union needs as much," it is explained, "that they are always meeting someone from headquarters. And it will be up to the pilots to keep the regional directors 'on line.'"

• **Leadership.** Executive-Beltsville doesn't think the regional ALPA will work, either. To him, it's "government by committee," and completely foreign to his type of operation.

David Beltsville was a Labor Leader, the one, the only spokesman for the pilots. No other voice mattered.

The union now will find themselves dealing with a Labor Executive. For the present, that executive is Chester N. Sykes.

Beltsville told Associates When that he believed ALPA will never have a president who will serve for 30 years. If the plan of the new group went on, he is undoubtedly right. It is perhaps a hint of the future: first the



PROPOSED INTERCHANGE PLAN would give Miami, Houston, New Orleans competitive through service routes to the East West Coast.

## New Through-Service-to-West Interchange Plan

Miami, New Orleans and Houston will get competitive through service to the West Coast if the Civil Aeronautics Board approves a joint interchange agreement filed by Eastern, Midwest and Trans World Airlines.

Following CAB's own suggestion, it is now discussing on the southern route to the West Coast, these three airlines have applied for Miami-West Coast interchange, giving new plane service via New Orleans, Houston, Atlanta and other intermediate points. They plan to use TWA and Eastern Connect.

So Miami-West Coast passengers can choose between Continental service provided by TWA, Boeing and Eastern or DC 6 service by American, Delta and

Norwest. Eastern-West Coast passengers can choose between Continental service by Boeing and TWA or DC-6 service by Continental and American.

Original CAB dreams gave Miami only one direct West Coast-Northeast flight-American interchange via New Orleans and Dallas, that route is already operating. Original CAB also gave Houston only one direct West Coast-Northeast flight-Continental-American interchange via San Antonio and El Paso to Dallas reach controlled by Boeing, Houston, and CAB member Jack Lynch.

That arrangement never got going. CAB revised the decision and asked the two new pending routes the Eastern-Borel/TWA Miami-West

Coast interchange via Houston, and the Houston-West Coast interchange by Continental and American.

The new Eastern-Borel/TWA interchange will also bring in TWA to back the American-Borel interchange in the western half of southern service to the west as arranged in the original CAB decision.

The new interchange will also give Boeing a significant share of the traffic through the old decision, Borel said it should be less rather than gain by adding tickets on the original interchange route from Houston. And Eastern, which now let out certain routes, would now get a Miami/Houston turn-Gulf share of the traffic.

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regenerative plan only for the executive vice president to be the general manager of the association and that Sykes, although now president, could, on demand, the general manager of ALPA.

If Beland's statement was correct at Sykes, Sykes is probably right. For Sykes never wanted to be president of the organization.

► Sykes's Entry—One who was present at the board of directors meeting that elected Sykes says, "We agreed at the time that we had a choice with a boy at the top. Nobody's name was in that box. After saying 'No' two or three times, Sykes let it just be there in the box."

Clements, N. ("Clancy") Sykes (left, seated, second), at 32, is perhaps the country's youngest president of a major union. (While ALPA has only 5,000 active and 3,000 other members, that relative handful decides whether a bill will pass the industry committee.) He came into the Air Line Pilots Assn. in March, 1949, an appointment by the union for new pilots, David L. Beland. It was a reluctant appointment when Beland was barely 20 years old.

At the ALPA convention in the fall of 1948, the bylaws were amended to permit appointment by the president of an executive vice president to serve until the 1950 convention when the post would be filled by election. Beland's choice, and he probably would be disappointed, that the proposal for the new office was his. The members were not certain it was a wise step, he says, as they considered it with "reluctance."

Whether misguided or not, they were particular conditions.

The amended bylaws provided that the convention should nominate any number of men for the position of executive vice president, and from that list the president would select the officer. But the president could remove the executive vice president at any time prior to the 1950 convention, provided only that he report his reasons to the next executive board meeting or convention. (When Beland's "No" Sykes after the executive board meeting that approved the amended constitution, he said that the removal of the bylaws as he authority, overlooking the fact that Sykes had been elected to his position in 1950.)

Beland's first 1948 convention gave him a list of 11 names. Only three men, he claims, had any qualifications at all for the job. He picked Sykes, but says, as the best of the three. Beland's goal was to be a pilot, as it came recently from a man motivated by what he considers flight duty by Sykes. Going to describe Sykes, Beland said he had no real qualifications for the job, but had a good education. "He's



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Al Segura, California

an intellectual," Beland said, and says fully, and I read in the Chicago Tribune that the head of Sykes, Beland (Gen. Robert Wood) says that's what is wrong with the country, too many intellectuals.

In his career, Dave Beland had decorated the two most prominent qualifications of Clancy Sykes for the job of commanding the Air Line Pilots Assn. ► Economics in the Air—Sykes's adult education began at Northern State College in Michigan where he was graduated with a B. A. at Michigan Tech. He moved to a master's degree. He earned his studies at the University of Minnesota, and switched to Southern Methodist University when he began flying with United Airlines as a co-pilot. Sykes never has finished up his Master's in economic geography at SMU, then taught that subject at the same school.

"Economic geography," he explains, "is studying the economy of a region in its geography." He says it is usually a coincidence that Beland has explained the economic geography of the region it serves more than on other maps.

Sykes looks and acts like the kind of man who would fit perfectly with a smoking jacket, pipe and oen of books in a parlor. He's slim, a good-looking, a man who's also, like former Air Force Gen. W. Stuart Symington, will cheer over his thoughts in long monologues of silence before uttering a question that engages in policy. The answer, when it comes, generally is complete and decided.

He writes with his left hand, due to a morning index finger on his right hand — a fact noteworthy, in an actual pilot only because it was the result of a boyhood shooting accident, and not in an accident.

As sure as can be determined from those around him, Sykes actually did not want the job at ALPA president. He said in many ways, and he says he was not too happy only the president, the Sykes-Clements, Niagara and ex-military Cynthia-Latimer moved into a new house in Chicago, a few miles west of Chicago. But says that he has the job, he has definite ideas of ALPA's future.

As he talks of reorganizing the union, his conversation is spiced with references to the American Model Assn. and the various big associations. Sykes believes these organizations are professional societies with state of the clarification of labor union. The pilots, professional men all, have been represented by an organization that was a labor union and nothing else. Sykes would like ALPA to be a labor union with many of the characteristics of a professional society. ► Time for the Masterly—"Twenty years old

and just coming into maturity," he says of ALPA. In a way, that says it up. To Sykes and those around him, ALPA's tomorrow, growing years are past. It is now time for the organization to consolidate gains and live a mature life.

ALPA has contacts with all the major unions, it has no intention of trying to take in pilots of the non-unionized carriers because the conditions are different, and it is fairly well-versed in the American Federation of Labor and not unionized. It will make no attempt to branch out in an industrial union in the Congress of Industrial Organizations union, although it

has affiliates which represent the union and non-union, the airline air carriers, flight engineers and numbered pilots. So it has no new words to conquer now in the field of what the pilots want.

According to George Colvin, ALPA's chief executive and "ambassador of courtesy," the pilots want first, job security, job security of security, working conditions, then, present settlement of government. Wages come last.

At the heart of job security—the thing the pilots most want—is the issue of making income determinations. Next, mileage increases, determination Featherbedding or fatigue relief?

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## CAB Sets 'Big Four' Mail Pay Rates

Final mail rates of 61 cents a ton, made last week and 45 cents from 1951 on for the Big Four airlines—American, Eastern, TWA and United—are officially proposed by Civil Aeronautics Board.

The final rate agreed to previously by CAB and the carriers against the final cost about \$4,938,000 that they were charged in last year and up to March 31.

The debt owed the Post Office by the big four in broken down to \$1,419,000 to March 31, 1958, and \$1,523,000 for the first quarter of this year.

Says the CAB of the final current rate of 45 cents per mail ton rate, this rate is compensatory—a "service" rate for of any liability to the carrier from the government.

## SHORTLINES

► **Air Express**—Covers revenue from U. S. air express shipments first half this year rose 61% over a year ago to \$1,665,778. Average shipment weighed 29 lb., compared with 20 lb. a year ago. Rate amount gained 17% over a year ago to \$1,147,454, although number of shipments declined 14% to 145,677. Tended to lower but heavier shipments being longer distances yielded higher revenue was spent in May and continued through June. Air Express division says.

► **Air Transport Association**—In the business cleared through the Airlines Clearing House the first six months of this year was up 45% over a year ago to \$112,553,490. June billings of 333,373,665 gained 31%.

► **Realtor International Airlines**—Carrier reorganized its route network into Miami without delay. Flying in a DC-6 on its southbound flight from Chicago and Houston to Ray de Janeiro. BNP plane has weekly flights through Miami to start with three DC-6s, two DC-10s. Schedules will increase when new equipment is ready. First DC-6B delivery is this month.

► **Central Airlines**—Control is asking CAB for permission to get emergency scheduled airline service into Maui, Hawaii, taking it with Waialeale and Tokyo, to help in the state's comeback from recent flood devastation.

► **Chicago & Southern Air Lines**—CALS reports net income of \$16,212 in first half of 1958 including \$1,880 profit on sale of DC-4 aircraft and spare) over

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perched with net of \$148,207 a year ago. Net operating income of \$941,354 on revenue of \$7,295,428 compared with \$159,455 on \$6,168,739 revenue a year ago.

► **Colonial Airlines**—Colonial's unaudited figures show a net profit of \$94,000 the first half, compared with a loss of \$122,000 a year ago. But CAB has issued a show-cause order pending resolution of Colonial's domestic and foreign mail pay, so the preliminary estimates may be revised at some later date.

► **El Al Israel Airlines**—El Al has added its third Constellation to operations, which include two flights a week New York, London, Athens and Tel Aviv, as well as fortnightly service to Nairobi and Johannesburg, South Africa.

► **Flying Tiger Line**—Tiger reports that June set a new revenue high at \$4,945,000, compared with previous high month of \$3,574,479 in April, 1958, and only \$535,554 a year ago. Freight load factor of 93% compared with previous high of 96% that February and with 75% June a year ago.

► **Seaboard & Western Airlines**—S & W's utilization of DC-4s on the Pacific network 14 in 10 days a day the second quarter of this year. Combined utilization of the company world-wide averaged 13 in 14 days in the same period.

► **Southern Airlines**—Southern's CAB continues to insist Gulfport-Memphis, Miss. as its north-south main between Jackson and Mobile.

► **Texas Eastern Airlines**—Tex Eastern has started operating its scheduled service on the U. S. trail between the Fort Worth, under contract from the government.

► **Trans World Airlines**—TWA carried net profit of \$2,621,000 in first six months this year, compared with \$1,609,000 a year ago. Operating revenue of \$66,416,000 rose up by \$14,759,000 while operating expenses rose \$12,247,000. Among its trans-Atlantic passenger travel, TWA had business ticket account for 36%, visiting friends and relatives 25%, vacationing 21%, government travel 10%, and miscellaneous 8%.

► **Western Central Airlines**—WCA has CAB order setting temporary net rate of base rate of 53 cents per mile from July 14, 1951 to May 31, 1952, and 46 cents thereafter. CAB estimates actual rate will be about 50 cents the first period and 40 cents a mile thereafter.



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## LETTERS

### Humidification

We were interested in your July 26, under "Inflight Oxygen" as which you noted that we had stopped using the built-in humidification system in our Boeing 777 throughout aircraft because there have been some questions because it adds the heat that the empty weight of the airplane had increased approximately 1,000 lb.

There are but a few aspects of the problem which we feel would be of interest to you and they fall briefly under these headings:

- (1) Increase in empty weight of the aircraft.
- (2) Moisture uptake into the skin as moisture.
- (3) Effect of humidification system upon the skin.

We have operated the humidification system since the aircraft were delivered to us and, in fact, use the only Boeing 777 operator to do so. We should like to point out that at no time have we seriously questioned the efficacy of the humidification system, with its strictly empty weight increase, as it will be readily inferred that the relative humidity on the ground is, in fact, less than New York during the winter months, and London during winter months, would in actual weighing weigh more than would be reduced artificially by the humidification system. A small amount of moisture absorption by the other luggage undoubtedly occurs, though this would be less than the result of atmospheric humidity than that produced by the cabin system.

With regard to (1) there it is, however, true that in some instances the design in the lower fuselage area were thoroughly tested with water when poured in the water system first after leaving, but this problem was, of course, localized to Boeing 777 operation during the winter months of the last year of operation when we were using the humidification system. It would therefore seem more likely that more confusion has arisen in popular's mind because the effect of water output on the humidification system and its weight increase of approximately 100 lb which was, in fact, due to this leakage of the lower fuselage.

We have, during a weight reduction program, accumulated for the 1,200 lb (about 100 lbs) in consistent loss within an insignificant amount. During the program a weight penalty, as a precautionary measure to ensure the aircraft sitting in the lower fuselage area is positively eliminate the "leaking" type effect of the humidification system would reduce the weight of water, which is water-consumption or water system leaks, particularly in the winter months, when leakage of water accumulation at the lowest fuselage level can be easily occur.

The object of the foregoing paragraph is to demonstrate we do indeed have "there" that the humidification system has anything significant to do with an aircraft weight increase due to lower fuselage leakage operators during the winter months of the humidification system, we feel

that we are likely to attain it because it does make a useful contribution to crew and passenger comfort.

G. A. W. Wright, Public Relations  
Boeing Commercial Airplane Corp.  
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### "Terrific"

CONGRATULATIONS OF THE SLICK NAVY DIVISION FIRST REACTION HERE IN WARE DIVISION HAS BEEN TERRIFIC. PRACTICALLY EVERY PERSON I HAVE CONTACTED HAS RESPONDED IT. WE ARE CONVINCED THAT AIRCRAFT WILL OPEN THE EYES OF MANY AIRCRAFT MANUFACTURERS TO OUR STORY. PLEASE ASK FOR YOUR COMMENTS IN RESPONDING THESE VIEWS.—BILLY HOLLAND, Slick Aircraft, Inc.

### New Fly-In List

Attached is the second annual edition of "Pacific Northwest Fly-In International Area." This edition, as its predecessor, is used for general pilots who want to become acquainted with the area. Thanks to your publishing this great pamphlet in AVIATION WEEK, we received requests for the information from private pilots of over the U.S.

H. F. HILL,  
Ambassador to Regional Administrators,  
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### Praise

The same staff of *Aviation Previews* has been Agency has in managing our appearance in the magazine is of great merit by Alexander McClellan in his article on AFRA published in *Aviation Week* recently.

GEORGE E. SCHWARTZ, Colonel, USAF,  
Director, AFRA  
Wright-Patterson AFB  
Dayton, Ohio

### An Economist Wonders

Why, oh why, not the million word note on water leakage to avoid the great waste of gasoline airplanes upon being tested in flight? I would like to see with more testing, waiting to take off.

I would like to see a discussion of LeGarde on the a number of times but prefer aviation (June 29). They must have been caught up with hanging around the run way with the water pump in need to test one of the four main pumps around the world.

DONALD M. KERR, Director  
Department of Economics  
McGraw-Hill Publishing Co.  
New York

## WHAT'S NEW

### New Books

**Fifty Years Fly-Past**, by Geoffrey Bonner. Published by Farnley Publications Ltd., 17 Fleet St., London, E.C. 4. Price 15 shillings, 346 pages, including index.

Beginning with the formation of the Royal Aero Club in 1901, the author chronicles fifty years of British aviation between those two covers, with much of the events told from first-hand knowledge. Particularly covered are the pioneers' record-breaking flights, air races, and other competitive events that took place during the period, such as the first Channel flight, the London to Australia race, the Schneider Trophy event, and many others.

Revised, complete with most of Britain's famous aviators and airplanes provide many original photographs on their characteristics and behind-the-scenes stories of competitive air flying.

The author has been invited to aviation since prior to World War I and apparently was present at every aviation event of any consequence during that period.

**The General Rule of Aircraft in Landing and Takeoff** details a method developed by Dr. Maurice Garbini, of the Garbini Research Foundation, for precisely and accurately solving any ground run problems using only elementary slide rule operations approximating the use of a specially designed calculation chart. Other practical uses of the method include determination of minimum stopping gear weight at a given aircraft for safe landing on any key runway having a given slope and given wind conditions; the numerous problems in the study of effects of adverse thrust during various phases of climb and other various problems. The Foundation's address is 1794 Lake St., San Francisco 21, Calif. Price of the complete kit is \$1.90.

### Telling the Market

Due to the demand for extra copies of *Aviation Week's* recent series of four articles, *The Allow Power for Flight, Engine Reaction in Design, The Engine: Power Aids, and The Power: Engine Aids*, the reprinting of *Aviation Week's* series of four articles has been arranged in full as pamphlet form. It is available free of charge. Write or letterhead to AVIATION WEEK, Market Research Department, McGraw-Hill Publishing Co., Inc., 1221 W. 42 St., New York 18.

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Weight, lb.	1/4	1/2	3/4	1	1 1/2	2	2 1/2
Stroke, in.	1/4	1/2	3/4	1	1 1/2	2	2 1/2

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## EDITORIAL

## OPS Threatens Plane Program

The Office of Price Stabilization wants to slap a price ceiling on every bit and piece in a military plane that would also fit on any commercial or private ship.

The aircraft components makers are in a state of shock, and rightly so. Likewise, the aircraft industry. And, significantly, so is the Department of Defense.

Locally thousands upon thousands of components that are installed on and in military planes could also fit somewhere on some non-military plane.

The president of one of our largest equipment companies tells us that such price ceilings would involve his company in a snowdrift of paper work for some 300,000 items.

Better look into this one quick, Mr. Wilson.

### One More Coach Line

It is definitely news when United Air Lines announces transcontinental coach service. UAL says its coaches will start flying between New York and San Francisco Sept. 30.

Old readers of this page know it wasn't long ago that officials of United—and some other certificated carriers—were denying they would ever take the coach step.

Those who took UAL's side splashed pungent remarks about coach addicts like us who obviously "know nothing about transportation economics." But transportation economics is exactly what has caught up with UAL, and others. Mass transportation, not luxury transportation for the few, builds a big, sound industry.

The traffic of the passenger carrying unscheduled routes has reached amazing proportions. But so has the scheduled carrier's business. Nor have the scheduled carriers ever made more profits than they are making now. Then the major certificated carriers can hardly make their old cry sound as convincing—that the non-scheduled, or even their own coach passengers, are diverting traffic from their first-class flights.

And, with mail rates going down, and the rest of Uncle Sam's monies to the airlines to be labeled as outright subsidies, it is harder to try to stave off coach service on the grounds that traffic is diverted and therefore equivalent mail service will cost more to the government.

Months ago it was the burgeoning business of the wheelchair-bound—not for sighted vision—but forced American first, then TWA, to start one daily coast-to-coast coach trip each way.

United, however, believed in the philosophy that an transportation (unlike any other form of transportation yet known) and certainly United's own brand, should be "first class" or luxury. It was also burdened with obsolescent DC-3s and DC-4s which were needed to carry its first-class passengers. So United hastened to construct new aircraft for coach passengers at low

income per head, even though high-density chicken  
raise more heads.

At one time, the company announced that it was expected on air coaches but would not start on each service until reasonably sure it would succeed. It was only a short time later it plunged into DC-4 coach flights in the most competitive airline route in the country—between Los Angeles and San Francisco. There, not only Westerns but at least a half dozen moving nonstops were scrambling for business at cut rates and is doing so eventually run up more passengers than tourist were arriving between these two cities.

To United management's surprise, those coaches paid off. There is still some unhappiness about this fact in United's executive ranks.

Just as TWA's and American's original dive into the transcontinental coach field was tormented by marked competition, so was the later descent of each line to add a second daily coast-to-coast roundtrip. This was at the height of the marked hearings on Capitol Hill when the newsmen introduced evidence that both TWA and American had written bids for coach flights extending into weeks, and obviously were not matching the airline demand for each service on short notice.

It is conceded in the industry that the worldwide competition has also forced United's coast-to-coast coaches board before the line was ready. It will not begin receiving delivery on additional new planes for many months. And management still is far from enthusiastic about coach. However, UAL's two other transcontinental scheduled competitors—mainly American—have been urging United to start some sort of scheduled coaches into San Francisco with almost nonexistent

Both TWA and American operate their coaches into Los Angeles. San Francisco has been wide open to the overnight for East Coast coach service.

It is also pointed out that the CAA's transcontinental coach service decision is due soon, involving the issue of whether any rights or certificates shall be given the lines now called non-scheduled carriers.

It is indicated that United was told the scheduled industry should be operating or definitely planning to operate at least one transcontinental coach service a day in and out of San Francisco. If this obtained, it would be rather for the Road to deny rights to nonroads.

All of this is said to explain some of the reasons why UAL is going into nationwide coaches before it really prefers to and why, to do so, it must offer its coach pilots older planes and slower schedules (up to 17 hours, 30 minutes westward; 14:45 eastward) than TWA, with its Constellations and Americans, with its DC-6s—both modern speedy, preferred aircraft. Some nonusers themselves are using DC-6s with schedules not much slower than United's. Nonusers fare as miserably lower, too.

Once again corruption or the threat of it would appear to be more powerful than the sole motive of public service itself.

—Robert H. Wood

—Robert H. Wood

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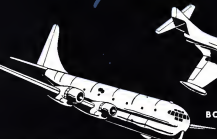


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